Chapter One

The Doctrinal Setting

The U.S. Third Army–XIX Tactical Air Command air-ground combat team is better understood in light of the doctrinal developments that preceded its joint operations in 1944 and 1945. Well before World War II, many army air leaders came to view close air support of army ground forces as a second- or third-order priority. After World War I the Air Service Tactical School, the Army Air Service's focal point for doctrinal development and education, stressed pursuit (or fighter) aviation and air superiority as the air arm's primary mission. Air superiority at that time meant primarily controlling the air to prevent enemy reconnaissance. At least among airmen from the early 1920s, tactical air doctrine stressed winning air superiority as the number one effort in air operations. Next in importance was interdiction, or isolation of the battlefield by bombing lines of supply and communications behind them. Finally, attacking enemy forces at the front, in the immediate combat zone, ranked last in priority. Airmen considered this "close air support" mission, performed primarily by attack aviation, to be the most dangerous and least efficient use of air resources.[1] Even in this early period, the air arm preferred aerial support operations to attack targets outside the "zone of contact."[2]

Evolution of Early Tactical Air Doctrine

By the mid-1930s, leaders of the renamed Army Air Corps increasingly focused their attention on strategic bombardment, which had a doctrine all its own, as the best use of the country's emerging air arm. Certainly among senior airmen at that time, tactical air operations ran a poor second to strategic bombardment as the proper role for the Army Air Corps. But this preference for strategic bombardment was not entirely responsible for the decline in attention paid to pursuit and attack aviation. Scarce resources and technical limitations contributed to tactical air power's decline in fortune. Pursuit prototypes, for example, competed with bombers for resources, and Air Corps leaders hesitated to fund them when they often could not agree among themselves or with their Army counterparts on the desired performance characteristics and engine types. At the same time, the aircraft industry preferred the more expensive bombers for obvious economic reasons, and also because that particular Army-funded development offered technological benefits for commercial aviation.[3]

In attack aviation, the Spanish Civil War demonstrated the high risks of relying on traditional tactics of low-level approach with the restricted maneuverability at that altitude, in the face of improving antiaircraft defenses. Attack aircraft thus had to be given whatever advantages of speed, maneuverability, and protective armor that technology allowed, and they also had to be mounted with sufficiently large fuel tanks to ensure an extended range with a useful bomb load. For single-engine aircraft, this challenge proved insurmountable in the late 1930s. Under the circumstances, civilian and military leaders considered the twin-engine light bomber the best available answer. In the spring of 1939, Army Air Corps chief, Maj. Gen. Henry H. (Hap) Arnold selected the Douglas A–20 Havoc for production. The fastest and most advanced of the available light bombers, it was clearly a major improvement over previous tactical aircraft. Nevertheless, it was neither capable of nor intended for precise, close-in support of friendly troops in the immediate battle zone. The A–20 fell between two schools: airmen criticized its light bomb load while Army officials considered it too large and ineffective for close air support of ground operations. The Army also disagreed with the Air Corps over enlisting pursuit aircraft in a ground support role. According to Air Corps tactical doctrine, pursuit aircraft should not provide close air support except in emergencies. As a result, before 1941 Army Air Corps fighters such as the Bell P–39 Airacobra and the Curtiss P–40 Warhawk, though suited to the close air support role, were seldom equipped or flown with bomb racks.[4]

After 1935, desires for an independent air force, doctrinal preferences, and financial limitations reinforced the airmen's focus on the strategic bombardment mission. Increasingly, Air Corps leaders relied on bombers rather than fighters in their planning for Western Hemisphere defense. Turned against an enemy's vital industries, they saw strategic bombing as a potential war-winning strategy. Above all, such a strategy promised a role for an Air Corps independent of direct Army control. For many airmen, a strategic mission represented the key to realizing a separate air force. The Boeing four-engine B–17 heavy bomber that first flew in 1935 appeared capable of performing effective strategic bombardment. Furthermore, in 1935, when the U.S. Army contributed to the revision of Training Regulation 440, *Employment of the Air Forces of the Army*, it gave strategic bombardment a priority equal to that of ground support. In an earlier 1926 regulation, strategic bombardment was authorized only if it conformed to the "broad plan of operations of the military forces." If the primary mission of the Army's air arm remained the support of ground forces, by 1935 the growing influence of the Army Air Corps and the need for a consolidated air strike force resulted in the establishment of General Headquarters (GHQ) Air Force, the first combat air force and a precursor of the numbered air forces of World War II. Although Air Corps leaders might emphasize strategic bombardment, they also upheld

conventional Army doctrine, asserting that "air forces further the mission of the territorial or tactical commander to which they are assigned or attached." Taken as a whole, the revised 1935 regulation represented a compromise on the question of operational independence for the air arm: although the air commander remained subordinate to the field commander, the changes clearly demonstrated the Air Corps' growing influence and the Army leadership's willingness to compromise.[5]

German *blitzkrieg* victories at the beginning of World War II rekindled military interest in tactical aviation, especially air-ground operations. On April 15, 1940, the U.S. Army issued Field Manual (FM) 1–5, *Employment of the Aviation of the Army*. Written by a board that Army Air Corps General Arnold chaired, it reflected the German air achievement in Poland and represented a greater compromise on air doctrine than did the 1935 Army training regulation. The field manual, however, reaffirmed traditional Air Corps principles in a number of ways. For example, it asserted that tactical air represented a theaterwide weapon that must be controlled centrally for maximum effectiveness, that the enemy's rear rather than the "zone of contact" was the best area for tactical operations, and that those targets ground forces could bracket with artillery should not be assigned to the air arm.[6] To some unhappy Army critics, the new manual still clearly reflected the Air Corps' desire to control its own air war largely independent of Army direction.

On the other hand, the 1940 Field Manual did not establish Air Corps-desired mission priorities for tactical air employment, but it did authorize decentralized air resources controlled by ground commanders in emergencies. Although the importance of air superiority received ample attention, the manual did not advocate it as *the* mission to be accomplished first. Rather, assessments of the particular combat situation would determine aerial mission priorities. Among other important intraservice issues it ignored, the manual did not address organizational arrangements and procedures for joint air-ground operations.[7] Field Manual 1–5 attempted to strike a balance between the Air Corps' position of centralized control of tactical air forces by an airman and the ground forces' desire to control aircraft in particular combat situations. Given this compromise approach to air support operations, much would depend on the role of the theater commander and the ability of the parties to cooperate and make the arrangements effective.

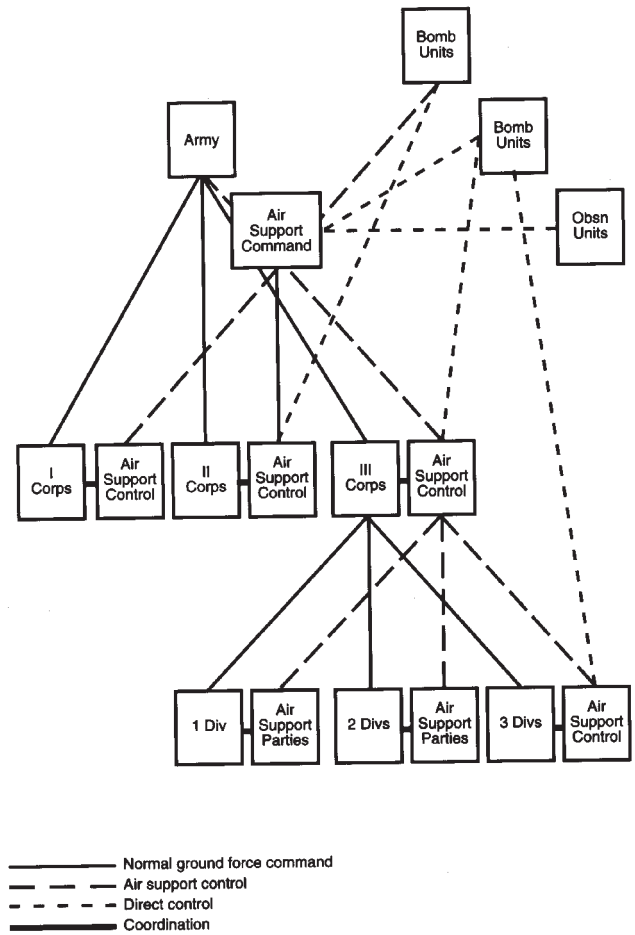
The common theme that emerges from these prewar doctrinal publications is one of compromise and cooperation as the most important attributes for successful air-ground operations. This theme reappeared in the manual issued following the air-ground maneuvers conducted in Louisiana and North Carolina in 1941 that tested the German system of close air support. In these exercises, newly formed air support commands operated with specific ground elements, but a shortage of aircraft, unrealistic training requirements, inexperience, and divergent air and ground outlooks on close air support led both

General Arnold and Lt. Gen. Lesley J. McNair, Commanding General of the Army Ground Forces, to declare the joint training unsatisfactory. Although the air and ground leaders exhibited patience and a willingness to cooperate, that spirit did not always filter down to the lower echelons of command. As a result, despite greater attention paid to close air support in all quarters, the state of air-ground training in the U.S. Army by the spring of 1942 was cause for genuine concern.[8] In response to these shortcomings and the country's entry as a combatant in World War II, the War Department published FM 31–35, *Aviation in Support of Ground Forces*, on April 9, 1942. This field manual stressed organizational and procedural arrangements for the air support command. Here, as in previous publications, there was much to satisfy the most ardent air power proponents in the newly designated Army Air Forces (AAF). The air support command functioned as the controlling agency for air employment and the central point for air request approval **(Chart 1)**. Later, in Northwest Europe, Air Support Command would be renamed the Tactical Air Command (TAC) in deference to air leaders in Washington and would support specified field armies. Centralized control of air power would be maintained by collocating air and ground headquarters and assigning air support parties to ground echelons down to the division level. The field manual called for ground units to initiate requests for aerial support through their air support parties, which sent them to the air support command. If approved, the latter's command post issued attack orders to airdromes and to aircraft.[9]

Field Manual 31–35 of 1942, like FM 1–5 (1940), acknowledged the importance of air superiority and isolation of the battlefield. It also declared that air resources represented a valuable, but scarce commodity. Accordingly, it deemed as inefficient the use of aircraft in the air cover role in which, when they were based nearby or circling overhead, they remained on call by the supported unit. The 1942 manual nonetheless stressed the importance of close air support operations "when it is not practicable to employ other means of attack upon the desired objective in the time available, or when the added firepower and moral effect of air attacks are essential to insure the timely success of the ground force operations."[10] Despite opposition expressed later by key air leaders, this rationale for close air support would govern the actions of General Weyland and other tactical air commanders in Northwest Europe. On the central question of establishing priorities for missions or targets, however, the manual remained silent, and this would cause difficulty.

In the final analysis, would the ground or air commanders control scarce air resources? The manual's authors attempted to reach a compromise on this fundamental issue. The 1942 Field Manual declared that "designation of an aviation unit for support of a subordinate ground unit does not imply subordination of that aviation unit to the supported ground unit, nor does it remove the combat aviation unit from the control of the air support commander." Attaching air units directly to ground formations was judged an excep-

Channels of Tactical Control of Combat Aviation in Typical Air Support Command



SOURCE: MORTENSEN, *A PATTERN FOR JOINT OPERATIONS*, P. 21.

Chart 1
Channels of Tactical Control of Combat Aviation in Typical Air Support Command

tion, "resorted to only when circumstances are such that the air support commander cannot effectively control the combat aviation assigned to the air support command."[11] Yet "the most important target at a particular time," FM 31–35 added, "will usually be that target which constitutes the most serious threat to the operations of the supported ground force. The final decision as to priority of targets rests with the commander of the supported unit."[12] In principle, therefore, air units could be parceled out to subordinate ground commanders, who were authorized to select targets and direct employment. Despite the central position accorded the commander of an air support command and explicit recognition that air assets normally were centralized at theater level, aviation units still could be allocated or attached to subordinate ground units.

Field Manual 31–35 of 1942, like its predecessors, attempted to achieve a balance between the extreme air and ground positions. This manual, however, underscored the importance of close cooperation among air and ground commanders:

> The basis of effective air support of ground forces is teamwork. The air and ground units in such operations in fact form a combat team. Each member of the team must have the technical skill and training to enable it to perform its part in the operation and a willingness to cooperate thoroughly.[13]

To its credit, the manual discussed in detail the command organization and air-ground techniques to be used across a broad spectrum of subjects, and airmen and ground officers involved in tactical air operations would adopt this manual as their how-to guide throughout the war. Though some have criticized it, they often seem to forget that it was AAF officers who drafted and issued FM 31–35; it was not forced on a reluctant air arm by antagonistic ground officers who failed to appreciate the uses of air power.

In the spring of 1942 time was needed to achieve the desired cooperation and to train air and ground personnel at all levels in the command and employment of air-ground operations. When the field manual appeared in April, however, Operation Torch, the Allied invasion of North Africa, was a scant six months away. How could the participants master the complexities of the most challenging of joint operations in so short a period? Despite what might appear as an irreconcilable conflict between air and ground perspectives of the day, the joint action called for by the manual proved to be less a problem than the limited time available to absorb its precepts and to solve practical problems at the field level. There was not enough time.

Doctrine in Practice: Operation Torch

Operation Torch became the desert crucible in which the Allies tested tactical air doctrine in combat. This initial Allied ground offensive of the Second World War also exposed the many weaknesses of an American nation unprepared for large-scale air and ground combat operations.[14] Although air-ground command arrangements for the invasion largely conformed to the 1942 FM 31–35, Allied headquarters completed a memorandum the month before the invasion that sought to clarify further air-ground command and control procedures. If anything, it served to enhance the role of the ground commander and, in the eyes of the air commanders, increase the chance that air power might be misused. Only after failure in the field would Lt. Gen. Dwight D. Eisenhower, Supreme Commander of Allied forces in northwest Africa, turn to the British example of teamwork displayed in the northeast African desert. There, Air Vice Marshal Sir Arthur Coningham and Lt. Gen. Sir Bernard "Monty" L. Montgomery, Commander of the British Eighth Army, operated an effective air-ground system based on equality of forces, joint planning, good communications, and a Royal Air Force (RAF) in command and control of its limited forces in the joint air-ground plan.[15]

In command of the invasion, General Eisenhower controlled all military resources in northwest Africa. If he thought of air forces in terms of theater interests, he chose not to designate a theater air commander, and British and American invasion forces remained loosely integrated. United States air forces were further decentralized to support the separate task forces during the invasion. Twelfth Air Force had its components parceled out to the three task forces, whose commanders had direct operational control of the air forces assigned to them as authorized by FM 31–35 **(Map 1)**. Similarly, the planners assigned British Eastern Air Command to support operations of the Eastern Task Force. Once the initial landings succeeded, plans called for an Allied task force to push eastward toward Tunisia, with supporting American air forces. Later, U.S. ground forces would be consolidated into U.S. Fifth Army, which would function as a planning and training headquarters, with XII Air Support Command attached to provide close air support to Fifth Army ground forces as required.[16]

Although the November 8, 1942, landings in French Algeria on the northwest African coast of the Mediterranean Sea succeeded easily, combat inexperience, logistics shortages, and the inability to establish all-weather airfields close to the battle zone during the race eastward toward Tunisia, combined to prevent defeat of the Axis forces. Effective close air support failed in the face of poor communications, an absence of radar, and the prevailing tendency of ground forces commanders to call for and rely on defensive air cover, and of airmen willing to give it. By December 1942, the Allied ground offensive proved unable to penetrate hastily formed German defensive lines west of

Map 1
Torch Landings in Northwest Africa: November 8, 1942

Reprinted from: Daniel R. Mortensen, *A Pattern for Joint Operations: World War II Close Air Support, North Africa,* (Washington, D.C.: Center for Military History, 1987), p 54.

Tunis. With the onset of winter, Eisenhower halted the offensive. Reviewing recent events, he criticized insufficient air support. With air forces larger than the enemy's, the Allies proved unable even to wrest local air superiority from the Germans and Italians. Clearly, it was time to regroup and reassess.[17]

In early January 1943, General Eisenhower centralized control of his tactical air forces in northwest Africa by creating the Allied Air Force. Commanded by Lt. Gen. Carl Spaatz, it was composed of the U.S. Twelfth Air Force and the British Eastern Air Command. Spaatz chose as his deputy Brig. Gen. Laurence S. Kuter who had been serving as the air operations officer on Eisenhower's staff. Kuter would prove to be a staunch proponent for adopting the British air-ground system, one that centralized control of aircraft under one airman reporting to the lead ground commander. Eisenhower sought in the reorganization to end piecemeal, decentralized air action largely along national lines. Yet, the vast distances, poor communications, and commanders who preferred operating along national rather than functional lines ensured that coordinating and centralizing the direction of close air support operations with ground forces would remain a problem. Even so, creation of the Allied Air Force served as an important move toward eventual centralized control of all air forces in the Mediterranean theater.[18]

Adversaries of the war in North Africa, Gen. Bernard Montgomery, Commander, British Eighth Army…

Air Power for Patton's Army

During the second Allied offensive in northwest Africa in January 1943, XII Air Support Command deployed from French Morocco on Africa's Atlantic coast to support II Corps in central Tunisia. Despite the best-laid plans of the XII's commander, Brig. Gen. Howard A. Craig, the airmen could muster little support when the Germans counterattacked II Corps in force on January 18. Among the many operational problems cited, air force officials stressed the misuse of air assets by the corps commander, Maj. Gen. Lloyd R. Fredendall. Army officers, however, judged enemy air superiority to be the most alarming. The Allies simply did not have sufficient aircraft to achieve local air superiority everywhere.[19]

At this juncture Eisenhower acted to achieve greater centralization of the air support effort by assigning General Kuter to command the newly created Allied Air Support Command in the Allied Air Force. Kuter collocated his headquarters at Constantine, Algeria, with that of Lt. Gen. K. A. N. Anderson, the British army commander of all Allied forces in northwest Africa involved in the Tunisian offensive. Kuter immediately set about controlling all Allied air support of ground operations. Yet, a few days later, when the Germans counterattacked in central Tunisia on January 30, 1943, Allied tactical air support broke down. Ground commanders repeatedly insisted on defensive air umbrellas that divided and dissipated the strength of the tactical air forces. Either many more aircraft had to be made available—most unlikely at that time—or the process of allocating aircraft had to be improved. Eisenhower and other key leaders in the theater did not believe the air doctrine to be at fault. They believed that doctrine was misapplied on the battlefield.[20]

The Battle of Kasserine Pass in mid-February 1943, highlighted the shortcomings of tactical air support of ground forces. Enemy troops over-

… and Field Marshal Erwin Rommel, Commander, Afrika Corps.

Brig. Gen. Laurence S. Kuter was deputy to General Spaatz and assumed command of the newly created Allied Air Support Command in the Allied Air Force.

ran Allied bases, communications broke down, bad weather restricted close air support activity, and unexpected friendly fire often proved more lethal to Allied airmen than did hostile German flak.[21] Of the many critics of air support during the land battle, British Air Vice Marshal Coningham, who assumed command of the Allied Air Support Command from Kuter during the course of the engagement, was perhaps the most influential and outspoken—as subsequent events at Gafsa made plain. Coningham immediately reorganized tactical air forces on the basis of the British Western Desert system of centralized resources, established mission priorities designed to conserve scarce forces, and placed senior airmen in control of *all* air elements.[22]

The colorful if volatile American tactician Maj. Gen. George S. Patton commanded II Corps near Gafsa during the battle for Tunisia in early 1943. On April 1, unopposed German aircraft bombed and strafed his command post killing three men including his aide-de-camp. Patton vented his anger against Allied tactical air forces in an April Fool's Day situation report, which, for emphasis, he transmitted under his own name. That brought an equally sharp retort from Coningham, now commander of Northwest African Tactical Air Force (NATAF), who bluntly questioned Patton's understanding of air power and the bravery of his troops. Intervention by senior officers and a personal meeting between the two soothed frayed tempers, but did not prevent further friction in air-ground operations.[23]

Air Power for Patton's Army

Patton's displeasure with air support in North Africa emphatically underscored the differing air and ground perspectives of tactical air operations in 1942–1943. Patton's complaints typified those of a field commander facing unopposed air attack without air support of his own. The solution for the ground commander most often fixed on securing direct control of the aircraft that could provide continuous air cover over his lines. (Unchallenged air attack against ground forces could hardly be explained away by airmen offering assurances that the supporting air force contributed best when attacking the enemy elsewhere. To front line troops, what remained unseen did not appear effective.) In response, Coningham could argue that the army misused tactical air power by parceling out aircraft to individual army units for combat air patrol missions to serve as a local air umbrella. That prevented the tactical air force from taking advantage of its flexibility and ability to concentrate forces to achieve air superiority. Even though Allied fighter-bombers might not be seen frequently by the foot soldier, Coningham believed them to be more effective in most cases when used primarily to attack the enemy's air forces in a counterair role and to perform interdiction operations to isolate the battlefield, rather than when committed in direct support of troops under fire.[24]

The air support changes that Coningham introduced reflected a larger reorganization of all Allied air and ground forces in the Mediterranean theater approved earlier at the Casablanca summit conference in late January 1943, and subsequently implemented throughout northwest Africa on February 18. General Eisenhower became the Mediterranean theater commander and controlled all Allied forces (**Chart 2**). For the first time, he operated with a genuine unified command set up along functional lines. British Air Chief Marshal, Sir Arthur Tedder, assumed command of all Allied air units in the Mediterranean. The Northwest African Air Forces (NAAF), led by General Spaatz, replaced the Allied Air Force, becoming the most important of Tedder's three regional air forces. It, in turn, consisted of three functional commands, with NATAF responsible for all tactical air support of ground forces in the region. Appropriately, Air Vice Marshal Coningham was named its commander.[25]

The new organizational arrangement also formally recognized distinct aerial priorities, with air superiority and interdiction preceding those of close air support. Air officers approved targets based on need and suitability, and air and ground officers performed planning functions jointly. Coningham issued a pamphlet which he circulated to reach the widest possible audience. Based on a short talk by British field commander General Montgomery (which, incidentally, Coningham authored), it praised the British Western Desert system of air-ground cooperation. That system, Montgomery asserted, succeeded by virtue of the coequality of the land and air forces and the spirit of cooperation.[26]

Despite the attack on Patton's headquarters by German aircraft in early April 1943, no one could doubt that air support improved after the reorganization. The organizational changes combined with good flying weather, more

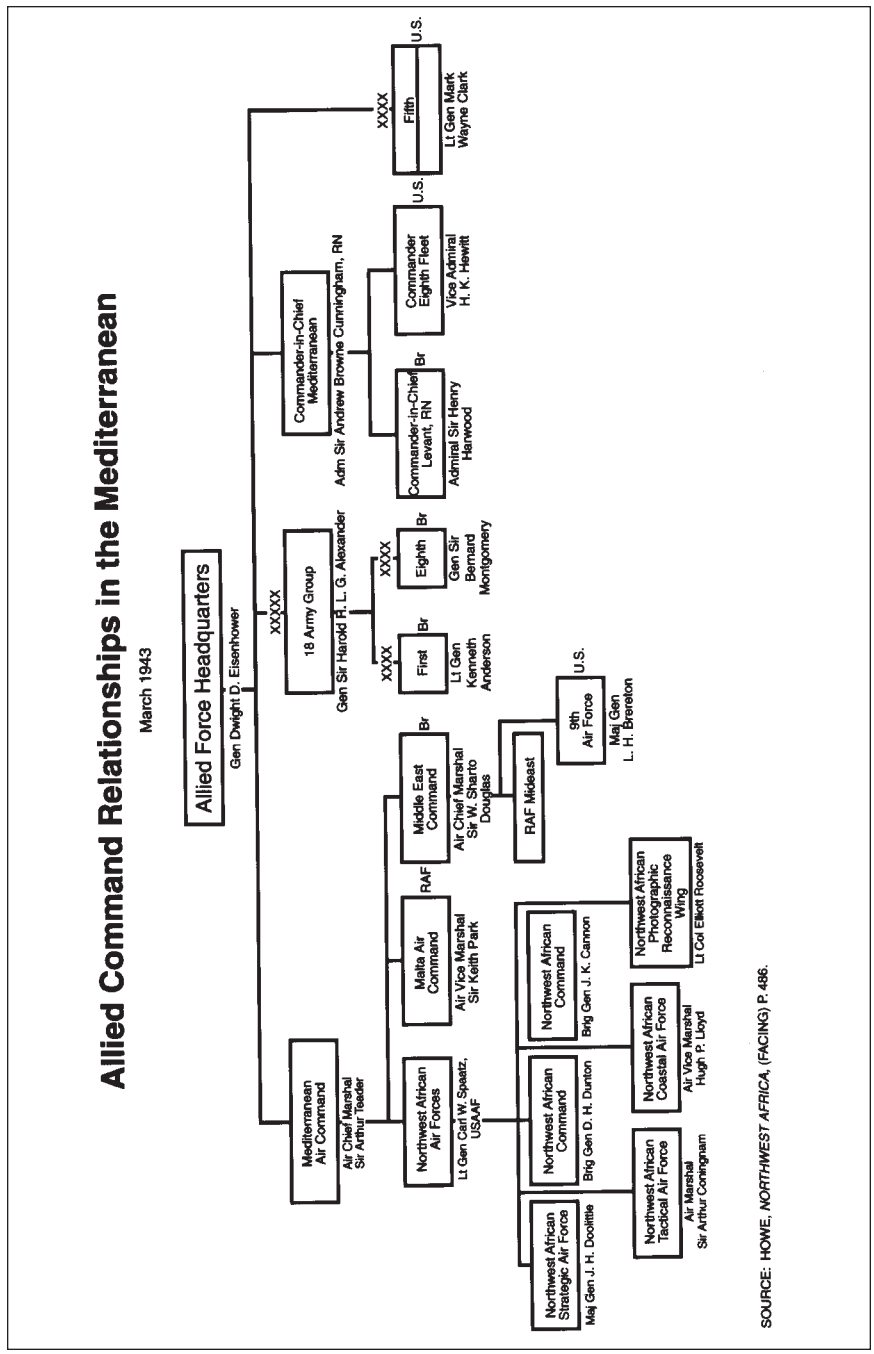


Chart 2
Allied Command Relationships in the Mediterranean, March 1943

support people, and many more aircraft improved Allied military performance. Air planning became more integrated as Montgomery's Eighth British Army, advancing westward from Egypt, forced retreating German troops back into Tunisia where General Anderson's forces, moving eastward from Algeria, sought to close the pincers. In this offensive, theater interests received top priority in decision-making. The successful attack in mid-March 1943, against the German-held Mareth Line, located along a 22-mile stretch of central Tunisia running from the sea to the Matmata Hills, and the ultimate defeat of German forces in May, highlighted the new flexibility and concentration of tactical air forces that, selectively, made local air superiority possible.

Some intractable problems nonetheless remained. Coningham, for example, never quite solved the air-ground request system to the satisfaction of ground commanders. Although centralized, the process functioned too slowly, especially for "on call" or "immediate" missions.[27] Poor communications equipment also could not transmit and satisfactorily receive over long distances. The solution would come later in Italy and Northwest Europe when pilots and ground controllers acquired improved radio communications equipment and the Allies had far more aircraft available for support. Strained relations among some commanders in North Africa also forced General Spaatz to spend most of the spring in 1943 keeping peace between air and ground officers and educating both sides on the need for cooperation. Nevertheless, communication problems and local enemy air attacks continued to prevent the Allies from achieving complete air supremacy until near the end of the campaign. Even then, success primarily came when Allied forces overran German airfields in Tunisia.[28]

Tactical Air Doctrine Refined

As military operations in North Africa drew near a close in the spring of 1943, tactical air doctrine became an increasingly important issue for airmen like General Kuter and others in Washington, D.C. Should FM 31–35 of 1942 be retained or, if revised, should it reflect the system now operating in North Africa? Additionally, could such a revision be done by air and ground officers in the spirit of cooperation and compromise that had characterized earlier doctrinal statements? Some officers were convinced that it was too late for compromise, and only wholesale acceptance of the new theater tactical air doctrine would do. In a scathing review of early failures in North Africa, written as he left his five-month combat tour for an air staff assignment in May 1943, Kuter described for AAF commander General Arnold what he judged to be specific misuses of tactical air power.[29] The air umbrella topped his list; he and other air force leaders judged this to be the core of the air-ground problem in North Africa. For them, it represented a wasteful and inefficient use of limited air forces that made the attainment of air superiority impossible. Yet,

not all ground commanders embraced the air umbrella concept. General Eisenhower, for one, firmly believed that ground forces should not expect permanent, defensive air cover. Not only were theater resources insufficient for such a task, he believed troops dependent on air cover were unlikely to exhibit the aggressiveness fostered by the combat of arms. Other Army officers, however, were much less inclined to forego the air umbrella idea.[30]

General Kuter also argued forcefully for American adoption of the British close air support system, contrasting the mistakes made between November 1942–February 1943, with the successes achieved after the post-Casablanca reorganization. Among the lessons cited, he called attention to concentrated forces employed against specific objectives, a composite theater force, and equality with the Army in decisions of air employment. By the spring of 1943, these lessons had become a familiar refrain in higher AAF circles. At the same time, Kuter acknowledged that the air forces required better communications with ground forces, and he criticized the AAF for shortages of communication equipment, deficient radar, and an inability to provide early warning of aircraft attack, or provide a reliable fighter control system. He saw the ultimate solution in an independent air force, where decisions on air operations would be made by airmen. Until that happened, air forces had to be made "coordinate"—coequal—with the ground forces to achieve successful air-ground operations.[31]

Gens. Lewis H. Brereton, Carl A. Spaatz, and Dwight D. Eisenhower (left to right) critique tactical air doctrine.

Air Power for Patton's Army

Generals Marshall, Arnold, and others in the War Department had previously been impressed with General Montgomery's pamphlet, written by Coningham, *Some Notes on High Command in War*, and with reports from other key participants in North Africa such as Generals Spaatz, Brereton, and Quesada. Kuter's critique helped prompt a revision of tactical air doctrine. Marshall assigned the task of revising American air-ground doctrine to the War Department General Staff's operations division and a special board of air and ground officers.[32] The resultant FM 100–20, *Command and Employment of Air Power*, issued July 21, 1943, epitomized AAF headquarters' interpretation of experiences in North Africa and the influence of Coningham's RAF system. Army chief of staff George Marshall, who initiated the project, approved the final document.

This field manual specifically addressed mission priorities and command arrangements. Like FM 31–35 of 1942, the new manual gave the preponderant role in the employment of aircraft to airmen, subject to the theater commander's final authority. In addition, it directed that air forces be centralized and not parceled out to specific ground commands, and that close air support missions be limited because of their difficulty, high casualty rate, and relative inefficiency.[33] New provisions reflected AAF thinking and influence in the War Department. In a dramatic opening section, FM 100–20 employed capital letters to proclaim and emphasize the equality of air power in joint warfare: "LAND POWER AND AIR POWER ARE CO-EQUAL AND INTERDEPENDENT

Gens. George C. Marshall and Henry H. "Hap" Arnold were impressed with the tactical air doctrine refined in North Africa under the British.

British Air Vice Marshal Sir Arthur Coningham (left), designer of close air support in North Africa, shares experiences in the African desert with Brig. Gen. Auby C. Strickland (center) and Lt. Gen. Frank M. Andrews.

FORCES; NEITHER IS AN AUXILIARY OF THE OTHER. THE INHERENT FLEXIBILITY OF AIR POWER IS ITS GREATEST ASSET…CONTROL OF AVAILABLE AIR POWER MUST BE CENTRALIZED AND COMMAND MUST BE EXERCISED THROUGH THE AIR FORCE COMMANDER IF THIS INHERENT FLEXIBILITY AND ABILITY TO DELIVER A DECISIVE BLOW ARE TO BE FULLY EXPLOITED."[34]

Field Manual 100–20 set an unequivocal hierarchy of aerial missions. "The gaining of air superiority is the first requirement for the success of any major land operation."[35] The manual specifically addressed, as a first prerequisite for air superiority, obtaining improved communications equipment for an effective fighter offense and, for defense, a reliable early warning radar network. In listing appropriate targets for the air superiority mission, it eliminated provisions for an air umbrella because it was "prohibitively expensive and could be provided only over a small area for a brief period of time."[36]

Next to air superiority, interdiction—aerial attack on enemy lines of communication and supply behind the front line—designed to achieve isolation of the battlefield received second priority. Close air support—attacking

enemy forces near or on the front line—ranked third. In justifying a last place for close air support, air power proponents normally cite only two sentences from the relevant paragraph: "In the zone of contact, missions against hostile units are most difficult to control, are most expensive, and are, in general, least effective.…Only at critical times are contact zone missions profitable."[37] Criticism of the close air support mission as wasteful, of course, was hardly new. Indeed, airmen had made it a major doctrinal point throughout the interwar period. The authors, however, clearly took pains to explain the difficulties of extensive close air support while stressing the importance of cooperation and coordination in attaining common goals. Even so, Army Ground Forces did not share the AAF's enthusiasm for the 1943 manual. In its view, the new doctrinal publication envisioned an air force less inclined than ever to support army operations. Army leaders complained, and legitimately so, that FM 100–20 had been issued *without* the concurrence of the Army Ground Forces. Obviously publication of the new manual would not improve air-ground relations overnight.

In a brief 14 pages, FM 100–20 (1943) attempted to end the imprecision and ambiguity in air-ground doctrine that characterized earlier attempts to create an effective air-ground relationship. From the AAF perspective, it emphatically stated the co-equality of aerial missions in joint operations, clarified lines of command and control, and established aerial mission priorities on which ground commanders could reflect. Yet, in practice FM 31–35 (1942) remained the key air-ground manual because it prescribed precise organization and procedures for specific combat situations, although that manual's cumbersome air-ground communications system and procedures remained problem areas.[38] Future air-ground teams, relying on trial and error and a cooperative spirit, would still have to devise arrangements that suited their peculiar theater circumstances and took advantage of better equipment in larger quantities. The regular army, it seems clear, never completely accepted FM 100–20; the manual remained largely a philosophical rather than a practical treatise. Indeed, FM 31–35 would be the manual later revised to incorporate wartime experiences.[39]

However gratifying it might be to airmen, in practice the new doctrine did little to influence future operations in a formal sense. Although FM 100–20 (1943) gave airmen greater independence and more say in the disposition and employment of air assets, General Weyland and other air commanders in the field still reported to Army officers of higher rank whom they were committed to support tactically. If these pragmatic airmen generally followed the 1943 precepts of FM 100–20, they never allowed theory to stand in the way of mission accomplishment. As a result, they would take liberties with command arrangements and mission priorities never envisioned by air advocates such as General Kuter and others like him on the air staff in Washington, D.C.

Despite legitimate areas of concern in air-ground relationships, Allied officers in North Africa during World War II for the most part cooperated

earnestly and tried sincerely to solve the thorny issues of command and control and of air-power mission priorities. The severe criticism of published doctrine used during Operation Torch is largely undeserved.[40] This combat effort, the first Allied combined and joint operation of the war, suffered most from inexperienced and inadequate forces operating with an air-ground doctrine yet to be tested in combat. The problems and frustrations encountered in the North African and Sicilian Campaigns did promote important improvements in command and control of air-ground operations. By the time of the Normandy buildup in early 1944, many air and ground officers had tested doctrine under combat conditions, worked out problems, and created bonds of friendship and trust that they brought with them to the campaigns in Northwest Europe. When confronting a common enemy, reality tempered the application of formal doctrine in the field, and cooperation tended to override intraservice and interservice rivalries.